

IN THE CLAIMS

Claim 1 (Withdrawn - **currently amended**): Pulverulent active substance formulations comprised of

- particles of at least one active substance A) which is solid at room temperature,
- at least one dispersant B),
- a coating ~~material E) of polyvinyl alcohol~~, and
- optionally additives C),

wherein the individual active substance particles are in an amorphous state, have an average diameter of not more than 1 µm, and are coated with ~~coating material E polyvinyl alcohol~~.

Claim 2 (Withdrawn): Active substance formulations according to Claim 1, wherein active substance A) is selected from the group consisting of ibuprofen, clotrimazole, fluconazole, indoxacarb, acetylsalicylic acid and ciprofloxazin.

Claim 3 (Withdrawn): Active substance formulations according to Claim 1, wherein active substance A) is selected from the group consisting of fungicides, bactericides, insecticides, acaricides, nematicides, molluscicides, herbicides and plant growth regulators.

Claim 4 (Withdrawn): Active substance formulations according to Claim 1, wherein active substance A) is selected from the group consisting of vitamins, carotenoids and flavors.

Claim 5 (Withdrawn): Active substance formulations according to Claim 1 wherein dispersants B) are selected from the group consisting of nonionogenic, anionic, cationic and zwitterionic substances having surface-active properties.

Claim 6 (Withdrawn): Active substance formulations according to Claim 1, comprising additives C) wherein additives C) are selected from the group consisting of penetrants, defoamers, low-temperature stabilizers, preservatives, dyes, redispersants, disintegrants, inert fillers and film formers.

Claim 7 (Withdrawn - ~~canceled~~): ~~Active substance formulations according to Claim 1, wherein coating material E) is selected from the group consisting of polyvinyl alcohol, polyvinylpyrrolidone and saccharides.~~

Claim 8 (Withdrawn - ~~canceled~~): ~~Active substance formulations according to Claim 7, wherein said coating material E is a saccharide and said saccharide is grape sugar, cane sugar or a polysaccharide.~~

Claim 9 (Withdrawn - ~~currently amended~~): Active substance formulations according to Claim 1, comprising

- from 10 to 50% by weight active substances A),
- from 5 to 50% by weight dispersant B)
- from 10 to 30% by weight of a coating material E) of polyvinyl alcohol, and
- from 0 to 50% by weight additives C).

Claim 10 (Withdrawn - ~~canceled~~): Active substance formulation according to Claim 7 or 9 wherein said coating material E) is polyvinyl alcohol.

Claim 11 (Withdrawn - ~~currently amended~~): Active substance formulation according to Claim 9, wherein said amount of active substance A) is from 15 to 40% by weight, said amount of dispersant B) is from 7.5 to 40% by weight, the amount of ~~said coating material E) polyvinyl alcohol~~ is from 15 to 30% by weight and the amount of said additives C) is from 0 to 40% by weight.

Claim 12 (Withdrawn): Active substance formulations according to Claim 1, wherein said particles have a number average diameter of from 10 to 1,000 nm.

Claim 13 (Withdrawn): Active substance formulations according to Claim 12, wherein said number average diameter is from 40 to 500 nm.

Claim 14 (Withdrawn - **currently amended**): Active substance formulations according to Claim 1, wherein ~~said coating material E) is polyvinyl alcohol~~, said active substance formulations are in the form of capsules of said polyvinyl alcohol and said capsules have an average capsule diameter of from 50 to 500 μm .

Claim 15 (Withdrawn): Active substance formulations according to Claim 14, wherein said average capsule diameter is from 10 to 150 μm .

Claim 16 (**Currently Amended**): Process for producing pulverulent active substance formulations comprised of:

- particles of at least one active substance A) which is solid at room temperature,
- at least one dispersant B),
- a coating ~~material E) of polyvinyl alcohol~~, and
- optionally additives C),

wherein the particles of active substance A) are in an amorphous state, have an average diameter of not more than 1 μm , and are coated with ~~coating material E) polyvinyl alcohol~~

said process comprising:

- a) suspending at least one solid active substance A) having a crystalline structure, at least one dispersant B), and optionally additives C) in a liquid aqueous phase at room temperature to form a suspension of a solid phase in the liquid aqueous phase,
- b) adding at least one compressible fluid D) in the supercritical state under pressure to the suspension formed in a),

- c) heating the mixture formed in b) to a temperature above the melting point of the solid components in the suspension to liquefy the solid components and form an emulsion,
- d) homogenizing the emulsion formed in c) and immediately cooling the emulsion to solidify particles of the active substance amorphously, and then adding an aqueous solution of ~~coating material E)~~ polyvinyl alcohol to avoid recrystallization of the active substance, and optionally additives C), to the homogenized emulsion
- e) depressurizing the homogenized emulsion and subjecting it to drying,

whereby the at least one dispersant B) is selected from the group consisting of reaction products of fatty acids, fatty acid esters, fatty alcohols, fatty amines, alkylphenols or alkylarylphenols with ethylene oxide and/or propylene oxide their sulphuric esters, phosphoric monoesters and phosphoric diesters, reaction products of ethylene oxide with propylene oxide, alkylsulphonates, alkyl sulphates, aryl sulphates, tetraalkylammonium halides, trialkylarlyammonium halides and alkylamine sulphonates, ~~and~~

~~whereby the coating material E) is selected from the group consisting of partially hydrolyzed polyvinyl acetates, having a degree of hydrolysis of from 72 to 99 mol% and a viscosity of from 2 to 40 mPa.s.~~

Claim 17 (Original): Process according to Claim 16, wherein step a) is carried out at a temperature of from 10°C to 30°C.

Claim 18 (Original): Process according to Claim 16 or 17, wherein step b) is carried out at a pressure of from 50,000 to 500,000 hPa.

Claim 19 (Original): Process of Claim 18, wherein said pressure is from 70,000 to 300,000 hPa.

Claim 20 (Previously Presented): Process according to one of Claims 16 or 17, wherein step c) is carried out at a temperature below the melting point (under

standard conditions) of the respective active substance or, in the case of active substance mixtures, below the melting point of the active substance having the highest melting point.

Claim 21 (Original): Process according to Claim 20, wherein said respective active substance or said active substance having the highest melting point has a melting point of from 40°C to 220°C.

Claim 22 (Original): Process according to Claim 21, wherein said melting point is from 50°C to 220°C.

Claim 23 (Original): Process according to Claim 16 or 17, wherein in step d) the emulsion is homogenized using a jet disperser or other high-pressure homogenizer or a homogenizer operating on the rotor/stator principle.

Claim 24 (Previously Presented): Process according to Claim 23, wherein step d) is conducted with a homogenizer subjecting the emulsion to a pressure difference in the homogenizer of from 40,000 hPa to 1,600,000 hPa.

Claim 25 (Original): Process according to Claim 24, wherein said pressure difference is from 50,000 hPa to 1,000,000 hPa.

Claim 26 (**Currently amended**): Process for producing pulverulent active substance formulations comprised of:

- particles of at least one active substance A) which is solid at room temperature,
- at least one dispersant B),
- a coating ~~material E)~~ of polyvinyl alcohol, and
- optionally additives C),

wherein the particles of active substance A) are in an amorphous state, have an average diameter of not more than 1 μm , and are coated with ~~coating material E) polyvinyl alcohol~~

said process comprising:

- a) suspending at least one solid active substance A) having a crystalline structure, at least one dispersant B), and optionally additives C) in a liquid aqueous phase at room temperature to form a suspension of a solid phase in the liquid aqueous phase,
- b) adding at least one compressible fluid D) in the supercritical state under pressure to the suspension formed in a),
- c) heating the mixture formed in b) to a temperature above the melting point of the solid components it comprises to liquefy said solid components and form an emulsion
- d) homogenizing the emulsion formed in step c) and immediately cooling the emulsion to solidify particles of the active substance amorphously,
- e) mixing the homogenized emulsion with an aqueous solution of ~~coating material E) polyvinyl alcohol~~ to avoid recrystallization of the active substance in a concentration of from 10 to 50% by weight, and optionally with additives C) and then depressurizing the dispersion and subjecting it to drying,

whereby the at least one dispersant B) is selected from the group consisting of products of fatty acids, fatty acid esters, fatty alcohols, fatty amines, alkylphenols or alkylarylphenols with ethylene oxide and/or propylene oxide, their sulphuric esters, phosphoric monoesters and phosphoric diesters, reaction products of ethylene oxide with propylene oxide, alkylsulphonates, alkyl sulphates, aryl sulphates, tetraalkylammonium halides, trialkylarlyammonium halides and alkylamine sulphonates, ~~and~~

~~whereby the coating material E) is selected from the group consisting of polyvinyl alcohol, polyvinyl pyrrolidone and saccharides.~~

Claim 27 (Original): Process according to Claim 16, 17 or 26, wherein said drying comprises spray drying or freeze drying.

Claim 28 (Original): Process according to Claim 27, wherein said drying is spray drying.

Claim 29 (Previously Presented): Process according to Claim 16, wherein in step e) the emulsion from step d) is depressurized at a rate sufficient to expand the compressible fluid and thereby explode the emulsified solid components, and optionally, at the same time is subjected to spray drying with a dry gas.

Claim 30 (Original): The process of Claim 29, wherein said dry gas is dry air, nitrogen or a noble gas.

Claim 31 (original): The process of Claim 30, wherein said dry gas is a noble gas.

Claim 32 (Original): Process according to Claim 29, wherein said gas is subjected to spray drying in step e), and said spray drying in step e) is carried out at a dry gas entry temperature of from 100°C to 200°C, and a dry gas exit temperature of from 50°C to 100°C.

Claim 33 (Original): Process of Claim 32, wherein said spray drying is carried out at a temperature of from 120°C to 180°C, and said dry gas exit temperature is from 60°C to 90°C.

Claim 34 (Previously Presented): Process according to Claim 16, wherein said drying in step e) is freeze drying, and water present in said homogenized emulsion is removed by said freeze drying.

Claim 35 (Original): Process according to Claim 16, wherein said compressible fluid D) is selected from the group consisting of hydrocarbons having 1 to 6 carbon atoms, Freons, nitrogen, noble gases, gaseous oxides, ammonia,

alcohols having 1 to 4 carbon atoms, halogenated hydrocarbons, and mixtures thereof.

Claim 36 (Original): Process of Claim 35, wherein said compressible fluid D) is selected from the group consisting of methane, ethane, propane, butane, pentane, n-hexane, i-hexane, nitrogen, noble gases, N₂O, CO₂, ammonia, methanol, ethanol, isopropanol, n-propanol, butanol, halogenated hydrocarbons, and mixtures thereof.

Claim 37 (Withdrawn): Method for applying an active substance to a site, which comprises applying said active substance to said site in the form of a pulverulent active substance formulation of Claim 1.

Claim 38 (Withdrawn): Method of applying active substances to a targeted organism and/or its habitat, which comprises delivering said active substances to said organism or habitat in the form of the pulverulent active substance formulation of Claim 1, optionally after dilution with extenders and/or surface-active substances.

Claim 39 (Withdrawn): Apparatus for carrying out the process according to Claim 16, comprising at least a device for metering a compressible fluid D) under pressure into a pressure-resistant vessel (2) which is provided with a stirrer and is connected via a pump (3) suitable for generating pressure to a heat exchanger (4), to which a homogenizing jet disperser (5), is connected, from which a pipeline closable with a valve leads back into the vessel (2) and from which, optionally, a pipeline leads to a cooling circuit which is provided with a pump and whose outlet line is connected to a metering pump (9) and also, optionally, to a mixing vessel, the pipeline leading on from the latter being connected to a spray dryer (10).

Claim 40 (Currently Amended): Process for producing pulverulent active substance formulations comprised of:

- particles of at least one active substance A) which is solid at room temperature,

- at least one dispersant B),
- a coating ~~material E)~~ of polyvinyl alcohol, and
- optionally additives C),

wherein the particles of active substance A) are in an amorphous state, have an average diameter of not more than 1 µm, and are coated with ~~coating material E)~~ polyvinyl alcohol

said process comprising:

- a) suspending at least one active substance A) which is solid at room temperature, at least one dispersant B), ~~at least one coating material E)~~ polyvinyl alcohol as a coating material to avoid recrystallization of the active substance, and optionally additives C) in an aqueous phase at room temperature,
- b) adding at least one compressible fluid D) in the supercritical state under pressure to the suspension formed in a),
- c) heating the mixture formed in b) until the solid components it comprises are liquefied, to form an emulsion,
- d) homogenizing the emulsion formed in step c) and immediately cooling the emulsion to solidify particles of the active substance amorphously, and then
- e) depressurizing the emulsion and subjecting it to drying,

whereby the at least one dispersant B) is selected from the group consisting of reaction products of fatty acids, fatty acid esters, fatty alcohols, fatty amines, alkylphenols or alkylarylphenols with ethylene oxide and/or propylene oxide, their sulphuric esters, phosphoric monoesters and phosphoric diesters, reaction products of ethylene oxide with propylene oxide, alkylsulphonates, alkyl

sulphates, aryl sulphates, tetraalkylammonium halides, trialkylarlyammonium halides and alkylamine sulphonates, ~~and~~

~~whereby the coating material E) is selected from the group consisting of polyvinyl alcohol, polyvinyl pyrrolidone and saccharides.~~

Claim 41 (Canceled)

Claim 42 (Previously presented). Process according to Claim 16, 26 or 40, which

comprises using additives C), wherein additives C) are selected from the group consisting of penetrants, defoamers, low-temperature stabilizers, preservatives, dyes, redispersants, disintegrants, inert fillers and film-formers, and

wherein penetrants are substances selected from the group consisting of alkanol alkoxylates of the formula R-O-(AO)_mH in which R is straight chain or branched alkyl having 4 to 20 carbon atoms, AO is an ethylene oxide radical, a propylene oxide radical, a butylene oxide radical or mixtures of ethylene oxide and propylene oxide radicals, and m is a number from 2 to 30, and

wherein defoamers are silicone oil and magnesium stearate, and

wherein low-temperature stabilizers are substances selected from the group consisting of urea, glycerol and propylene glycol, and

wherein preservatives are Benzylhemiformal and 1,2-Benzisothiazol-3(2H)-one, and

wherein redispersants are substances selected from the group consisting of lactose, urea polyethylene glycol and tetramethylolpropane, and

wherein disintegrants are salts, and

wherein inert fillers are substances selected from the group consisting of carbonates, silicates, oxides and urea-formaldehyde condensates, and

wherein film formers are substances selected from the group consisting of gelatin, water-soluble starch, water-soluble copolymers of polyvinyl alcohol and polyvinyl-pyrrolidone.

Claim 43 (Canceled)

Claim 44 (Canceled): ~~Process according to Claim 16, 26 or 40, wherein coating material E) is a saccharaide selected from the group consisting of grape sugar and cane sugar or is a polysaccharide.~~

Claim 45 (Canceled): ~~Process according to Claim 16, 26 or 40, wherein said coating material E) is polyvinyl alcohol.~~